

Effects of Nucleus Ice Annealing History on Cometary Outgassing

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An important consideration for comet modeling is the dependence of the thermal conductivity on the comet structure. The microporosity of the cored ices changes with time as the phase of the ice and its annealing history progresses. The comet model of Alexander and Gombosi models multi-component diffusion of gas within the nucleus using 3 volatiles; water, CO₂, and CO, as well as a dust component. The model also accounts for the effect of the vapor phase on the nucleus thermal conductivity. The model can integrate through a limited series of discrete changes to the microstructure and corresponding changes to nucleus thermal conductivity. Effects of these changes on the overall gas production, as a function of time, will be presented.